

Priority 4: Improve ecosystem water quality
Constituent Information
What ecosystem water quality constituent(s) are you targeting?
Suspended Solids as discharged to the Pacific Ocean from the City's Point Loma Wastewater Treatment Plant.
Summarize how the proposed actions will improve the ecosystem water quality in relation to the target constituent.
<p>For twenty years, the City has demonstrated a strong commitment to the environment having successfully operated the Point Loma Wastewater Treatment Plant (PLWTP) with a modified NPDES permit. Over this period, the City has met water quality requirements and has not negatively impacted the ocean environment under close scrutiny of the US Environmental Protection Agency (EPA), State permitting agencies and opinions from scientists at the Scripps Institution of Oceanography.^{1, 2} While the City has proven that all mandated requirements have been met, environmental stakeholders have noted that investing in Pure Water provides even greater environmental benefits. Below summarizes the City's input on the PLWTP environmental benefit and our opinion of the stakeholders input on the PLWTP environmental benefit.</p> <p>City's Input on Environmental Benefits – Implementing Pure Water provides significant environmental benefits to help offset future flows and total suspended solids discharged to the ocean environment. As growth occurs, future wastewater flows that would normally go to the PLWTP will be diverted to the Pure Water facilities upstream of the PLWTP and will be treated to higher levels producing potable reuse water that will be introduced into the drinking water system. As a result those wastewater flows and associated pollutants will be permanently removed from the system and not included in the influent to the PLWTP, thereby reducing the discharge to the ocean environment.</p> <p>Stakeholders Input on Environmental Benefits – Stakeholders, including the San Diego Coastkeeper and the Surfrider Foundation (both participants in the Recycled Water Study,³ that developed Pure Water) have stated their support for the Pure Water Program due to its environmental benefits. A major focus for these environmental stakeholder groups is removal of wastewater discharges to the ocean environment. They value Pure Water for its ability to immediately reduce flow and total suspended solids (TSS) released to the environment.</p>
<p>Measurement of TSS in wastewater is often used to assess the efficiency of a wastewater treatment system. TSS itself can have impacts on the receiving water environment and the small suspended particles can be associated with other pollutants such as toxic metals and organics.⁴ Accordingly, the measurement of TSS in the discharge is appropriate to assess the improvement in the ocean discharge as a result of upstream off-loading of the PLWTP system by the potable reuse plants.</p> <p>Estimated Initial Quantitative Benefit – Water quality at the PLWTP is typically tied to flow and total suspended solids. The City has estimated the following comparative quality parameters for the PLWTP both with and without Pure Water in Year 2022 (the first year of the project operation):</p> <p>Year 2022:</p> <ul style="list-style-type: none"> • PLWTP without Pure Water* <ul style="list-style-type: none"> o Average Daily Flow estimated at 156 million gallons per day o Total Suspended Solids discharged to ocean estimated at 10,100 metric tons • PLWTP with Pure Water* <ul style="list-style-type: none"> o Average Daily Flow estimated at 126 million gallons per day o Total Suspended Solids discharged to the ocean estimated at 8,400 metric tons <p>*These values were determined in the mass balance model provided to the City of San Diego by Brown and Caldwell in Task Order 24 (Brown and Caldwell Inc. Draft Metropolitan Biosolids Center Biosolids Technology Evaluation. Provided to the City of San Diego under Task Order 24, P. 7-13 to 7-14, Figure 7-1, Tables 7-5 to 7-10 and P. 258/450 and 315/450 of the PDF, February 24, 2017) see attachment a-1 of submitted documents</p> <p>By Year 2030:</p> <ul style="list-style-type: none"> • PLWTP without Pure Water* <ul style="list-style-type: none"> o Average Daily Flow estimated at 163 million gallons per day o Total Suspended Solids discharged to ocean estimated at 10,900 metric tons • PLWTP with Pure Water* <ul style="list-style-type: none"> o Average Daily Flow estimated at 133 million gallons per day o Total Suspended Solids discharged to the ocean estimated at 9,000 metric tons

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*These values were determined in the mass balance model provided to the City of San Diego by Brown and Caldwell in Task Order 24 (Brown and Caldwell Inc. Draft Metropolitan Biosolids Center Biosolids Technology Evaluation. Provided to the City of San Diego under Task Order 24, P. 7-13 to 7-14, Figure 7-1, Tables 7-5 to 7-10 and P. 258/450 and 315/450 of the PDF, February 24, 2017) see attachment a-1 of submitted documents

1. US Environmental Protection Agency Final Decision of the Administrator Pursuant to 40CFR part 125, subpart G. 2017. Available at: https://www.epa.gov/sites/production/files/2017-08/documents/ca0107409-point_loma_301h_decision_and_tdd_2017-08-04.pdf
2. US Environmental Protection Agency, and California Regional Water Quality Control Board. 2017. Order R9-2017-0007, NPDES No. CA0107409 Waste discharge Requirements and NPDES permit for City of San Diego E. W. Blom Point Loma Wastewater Treatment Plant Discharge to the Pacific Ocean through the Point Loma Ocean Outfall, August 2017. Available at: https://www.waterboards.ca.gov/sandiego/board_decisions/adopted_orders/2017/R9-2017-0007.pdf
3. Brown and Caldwell. 2012 Recycled Water Study. Available at: <https://www.sandiego.gov/sites/default/files/legacy/water/pdf/purewater/2012/recycledfinaldraft120510.pdf>
4. National Research Council. Water Science and Technology Board. Managing Wastewater in Coastal Urban Areas. Executive summary and introduction; pp 1- 27. National Academy Press. Washington D.C. 1993. Available at: <https://www.nap.edu/catalog/2049/managing-wastewater-in-coastal-urban-areas>

Does the proposed ecosystem water quality improvement benefit habitats or species life stages? How?

Yes, it is widely accepted that suspended solids are an important cause of water quality deterioration leading to declines in fisheries and ecological degradation of aquatic environments. Higher concentrations of suspended solids can lower water quality by absorbing light. Waters then become warmer and lessen the ability of the water to hold oxygen necessary for aquatic life. Because aquatic plants also receive less light, photosynthesis decreases and less oxygen is produced. The combination of warmer water, less light and less oxygen makes it impossible for some forms of life to exist. Suspended solids affect life in other ways. This can clog fish gills, reduce growth rates, decrease resistance to disease, and prevent egg and larval development. Particles that settle out can smother fish eggs and those of aquatic insects, as well as suffocate newly-hatched larvae.

In their work on "Managing Wastewater in Coastal Urban Areas", the National Research Council's, Committee on Wastewater Management for Coastal Urban Areas, Water Science and Technology Board found that suspended solids discharged from large wastewater outfalls had been a cause of localized accumulations of anaerobic sediments which as a result could negatively impact ocean seafloor habitats.¹ Control of suspended solids can also be driven by the need to protect the ocean sediments and biota from accumulations of particle associated pollutants such as toxic organics and metals. In addition to sedimentation that can affect the seafloor, suspended particles in wastewater discharge can cause excess turbidity and shading of seagrasses.¹

1. National Research Council. Water Science and Technology Board. Managing Wastewater in Coastal Urban Areas. Executive summary and introduction; pp 1- 27. National Academy Press. Washington D.C. 1993. Available at: <https://www.nap.edu/catalog/2049/managing-wastewater-in-coastal-urban-areas>

Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the chemistry, toxicity, and negative effects constituents are described (i.e. Material Safety Data Sheets).

Enter location(s)

Surfrider Support Summary

<https://sandiego.surfrider.org/2017/05/16/why-surfrider-supports-the-pure-water-project-and-the-waiver-at-point-loma-treatment-plant/>

Point Loma Wastewater Treatment Plant Annual Report

https://www.sandiego.gov/sites/default/files/plwtp_annual_2015.pdf

REV 2: Magnitude of ecosystem improvements

What is the expected magnitude of the ecosystem improvement that will address this priority? Magnitude should be expressed as: a) the change from current conditions without the project to current conditions with the project, and b) the change from 2030 conditions without the project to 2030 conditions with the project. How did you estimate this value?

If the project intends to benefit multiple constituents, the magnitude of the change in each constituent needs to be provided.

Ecosystem Priorities Application Worksheet (August 2016)

The project will reduce the discharge of Total Suspended Solids (TSS) and other associated pollutants in the effluent from the Pt. Loma Wastewater Treatment Plant (PLWTP) that discharges treated effluent into the Pacific Ocean through the Point Loma Ocean Outfall (PLOO). In 2030 the PLWTP without the project is projected discharge 10,900 metric tons of TSS per year. With the project the discharge is projected to decline to only 9,000 metric tons of TSS for the year. This is a reduction of 1,900 metric tons of TSS to the ocean for the year. That is 17% less TSS and associated pollutants than would have gone to the ocean without the project. These values were estimated in accordance with standard engineering practices and presented in the mass balance model provided to the City of San Diego by Brown and Caldwell in Task Order 24 see attachment a-1 (Brown and Caldwell Inc. Draft Metropolitan Biosolids Center Biosolids Technology Evaluation. Provided to the City of San Diego under Task Order 24, P. 7-13 to 7-14, Figure 7-1, Tables 7-5 to 7-10 and P. 258/450 and 315/450 of the PDF, February 24, 2017)

Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the magnitude of the ecosystem improvement is described and quantified.

Attachment a-1 of submitted documents: Brown and Caldwell Inc. Draft Metropolitan Biosolids Center Biosolids Technology Evaluation. Provided to the City of San Diego under Task Order 24, P. 7-13 to 7-14, Figure 7-1, Tables 7-5 to 7-10 and P. 258/450 and 315/450 of the PDF, February 24, 2017

REV 3: Spatial and temporal scale of ecosystem improvements.

What is the geographical extent (e.g. river miles, acres) of the ecosystem improvement that will address this priority?

This ecosystem improvement is expected to benefit the Pacific Ocean and shorelines surrounding the in the vicinity of the PLWTP. The PLOO terminates in the Pacific Ocean 4.5 miles west of the PLWTP and at a depth of approximately 310 feet.¹ Upon initial dilution effluent TSS are mixed with the ambient marine particles and entrained in the receiving waters where they are subject to the effects of ocean stratification and currents.² The geographical extent of the improvement will depend on these variables but previous ocean monitoring indicates that the changes would be most apparent within the immediate vicinity of the discharge.¹ Past ocean monitoring has detected the only sustained effects that can be related to TSS have been mostly restricted to a few sites located within about 400-1000 feet of the outfall discharge zone.² These effects have included measurable increases in sediment sulfide and BOD concentrations.²

However, the ocean monitoring program, that will be the vehicle by which improvements are quantified, is very large and comprehensive and covers a spatial area of 340 square miles insuring that any improvements, even beyond the immediate vicinity of the discharge are measured.¹ A map of the discharge area and monitoring is attached.

- 1- City of San Diego - Public Utilities department - Environmental Monitoring and Technical Services Division. 2017. 2016 Annual Receiving Waters Report for the Point Loma Ocean Outfall and the South Bay Ocean Outfall, June 2017. Available at:
<https://www.sandiego.gov/sites/default/files/qarpt16.pdf>
- 2- City of San Diego - Public Utilities Department. 2015. Application for Renewal of NPDES CA0107409 and 301(h) Modified Secondary Treatment Requirements, Volume V, January 2015, Appendix C; P. C1-C4. Available at:
<https://www.sandiego.gov/sites/default/files/legacy/mwwd/pdf/facilities/2015/301vol5.pdf>

Additional locations in the application, supporting documentation or attachments (document name, page number, figure name or number, other) where the geographical extent of the ecosystem improvement is documented or mapped.

Enter location(s)

Attached are the following maps.

Page 8: Map 1 Point Loma Outfall Location Map

Page 9: Map 2 Ocean Monitoring Stations

When during the year will ecosystem water quality improvements be provided? How is ecosystem water quality likely to vary with hydrologic conditions (i.e. among water year types) a) under current conditions with and without the project, and b) in 2030 with and without the project?

If the project intends to benefit multiple constituents, provide the timing of water quality improvements for each constituent separately.

The reduction in solids load is expected to be consistent because the diversions for Pure Water will be relatively consistent throughout the year averaging 30 million gallons per day of potable reuse water production. So the commensurate reduction in TSS discharged at Pt. Loma will also be consistent and realized in the daily discharge from the PLWTP.

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Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the timing of ecosystem water quality improvements are documented.

REV 4: Inclusion of an adaptive management and monitoring program that includes measurable objectives, performance measures, thresholds, and triggers to achieve ecosystem benefits.

Provide additional information on how this ecosystem improvement will be incorporated into the adaptive management and monitoring program. If available, provide examples of objectives, performance measures, thresholds, or triggers that could be used to manage benefits associated with this priority.

Prior to start-up of the facilities, Operations and Maintenance (O&M) Manuals will be completed. The O&M Manuals will include protocols for operations and include troubleshooting procedures. The attached Enterprise Level Control Strategy report will serve as a cornerstone of how the facilities are operated. Since the facilities will produce purified potable water supplies via indirect potable reuse, the State's Division of Drinking Water will require significant redundancy measures and of monitoring of the facilities to protect public health. The North City Pure Water Project Title 22 Draft Report describes the operational parameters, monitoring and reporting, reliability and redundancy that will be implemented at the Pure Water facility.¹ These controls provide the failure prevention and failure response provisions that will allow the facility to reliably produce 30 MGD of potable reuse water on a daily basis, while insuring that all regulatory requirements are met to protect the public health.¹

Additionally, it is important to note that wastewater sludge that is removed at the Pure Water Facility will be transported in a dedicated pipeline for processing at a dedicated biosolids facility.¹ Sludge will not be returned to the sewer system. This seamless operation of the Pure Water facility in conjunction with the biosolids processing plant insures that TSS and related pollutants are reliably and continually removed from the wastewater system tributary to the PLWTP. Resulting in off-loading the influent to the PLWTP thereby reducing the TSS and associated pollutants in the discharge.

The relationship between wastewater treated at the PLWTP and discharged to the ocean via the PLOO with the coastal marine environment is thoroughly regulated by an extremely rigorous Monitoring and Reporting Program (MRP) that includes assessments of both effluent quality and receiving waters (ocean) conditions.^{2,3} This MRP is codified in the NPDES discharge permit for the PLWTP.⁴ The program has been specifically designed to interface seamlessly with another program for the South Bay Ocean Outfall, and as such to be able to assess any impacts of the wastewater discharges as well as other anthropogenic or natural influences on San Diego marine environment.³ The combined Ocean Monitoring Program covers about 340 square miles off the San Diego coast, from Northern San Diego County to Northern Baja California and from the shoreline to 10 miles off shore and to depths of about 1600 feet³ (also see page 9: Map 2 Ocean Monitoring Stations)

The TSS in the discharge is measured daily in the monitoring of PLWTP influent and effluent.² The comprehensive design of the ocean monitoring program makes it fully capable of detecting and evaluating any effects of TSS or other components in the discharge. Seafloor sediments and their associated biological communities are sampled and analyzed at 89 locations each year off San Diego, of which 22 core stations are designed specifically to assess any impacts of the PLWTP discharge.^{2,3} The remaining stations are designed to either monitor the SBOO region or to provide further background data on reference conditions for the entire San Diego region. Specific parameters are analyzed in the ocean sediments that can be affected by the amount of TSS in the discharge including grain size, total organic carbon, biochemical oxygen demand, sulfides, metals and toxic organics.^{2,3} The small marine invertebrates (e.g. worms, crabs, snails, brittle stars) living within or on the surface of the ocean floor are also identified and enumerated in order to assess the health and status of their communities.^{2,3}

Due to at least in part to the present low levels of TSS in the PLWTP discharge very little evidence exists of any possible TSS effect on the marine environment.⁵ Most of the measured parameters have continued to exist at levels within the range of natural variability for the San Diego region and other Southern California Bight reference areas.⁵ The only sustained effects that may be related to TSS or other wastewater constituents have been restricted to mostly a few sites located within about 400-1000 feet of the outfall discharge zone (i.e. near the zone of initial dilution, ZID).⁵ These near-ZID effects have included measurable increases in sediment sulfide and BOD concentrations.⁵ However, none of these small increases have affected the sediment quality to the point where the resident marine biota has been significantly impaired or degraded.⁵ In future years San Diego's Ocean Monitoring Program will continue to be able to track and quantify these and any other effects that may result from changes in the amount of TSS discharged.

1. Draft North City Pure Water Project Title 22 Engineering Report. January 2018; Section 13, Reliability; pages 13-1 thru 13-39; Section 15, Monitoring and Reporting Program: pages 15-1 thru 15-27, Section 16, North City Operation Plan: pages 16-1 thru 16-15 and Section 6, Project Facilities Description: pages 6-31 thru 6-32. See attachment a-2 of submitted documents

Ecosystem Priorities Application Worksheet (August 2016)

2. US Environmental Protection Agency, and California Regional Water Quality Control Board. 2017. Order R9-2017-0007, NPDES No. CA0107409 Waste discharge Requirements and NPDES permit for City of San Diego E. W. Blom Point Loma Wastewater Treatment Plant Discharge to the Pacific Ocean through the Point Loma Ocean Outfall, August 2017, Attachment E; P.E-1 thru E-39. Available at:
https://www.waterboards.ca.gov/sandiego/board_decisions/adopted_orders/2017/R9-2017-0007.pdf
3. City of San Diego - Public Utilities department - Environmental Monitoring and Technical Services Division. 2017. 2016 Annual Receiving Waters Report for the Point Loma Ocean Outfall and the South Bay Ocean Outfall, June 2017. Available at:
<https://www.sandiego.gov/sites/default/files/garpt16.pdf>
4. US Environmental Protection Agency, and California Regional Water Quality Control Board. 2017. Order R9-2017-0007, NPDES No. CA0107409 Waste discharge Requirements and NPDES permit for City of San Diego E. W. Blom Point Loma Wastewater Treatment Plant Discharge to the Pacific Ocean through the Point Loma Ocean Outfall, August 2017. Available at:
https://www.waterboards.ca.gov/sandiego/board_decisions/adopted_orders/2017/R9-2017-0007.pdf
5. City of San Diego - Public Utilities Department. 2015. Application for Renewal of NPDES CA0107409 and 301(h) Modified Secondary Treatment Requirements, Volume V, January 2015, Appendix C; P. C1-C4. Available at:
<https://www.sandiego.gov/sites/default/files/legacy/mwwd/pdf/facilities/2015/301vol5.pdf>

REV 5: Immediacy of ecosystem improvement actions and realization of benefits

Immediacy of ecosystem improvement: Number of months from grant encumbrance until the proposed ecosystem improvement is completed (i.e. the expected timeframe until the improvement is implemented or construction is completed).

The Pure Water Phase 1 project is expected to be online in 2022. The beginning of the ecosystem improvement will be realized immediately upon start-up of the project as a reduction in TSS discharge will be immediately commensurate with the project going on line. Positive effects on the ocean environment may be recognized over a much longer time frame and may be subtle in nature but can become evident through the rigorous ocean monitoring and analysis of data carried out by the City of San Diego in compliance with the PLWTP National Pollutant Discharge Elimination System Permit (NPDES) discharge permit and in consultation with the USEPA, California State Regional Water Quality Control region 9, Southern California Coastal Water Research Project and Scripps Institution of Oceanography. Per California Water Commission schedule for the Water Storage Investment Program we anticipate grant encumbrance to be June 2018.

Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the immediacy timeframe is described and quantified.

Please see project schedule as attached in Tab 5 A.3 San Diego_Forecast Schedule.

Realization of ecosystem improvement: Number of months from the time the ecosystem improvement is completed (i.e. project is implemented or construction is complete), until the benefit associated with this priority can be observed (i.e. when measurable improvements can be observed and quantified)

Benefits will begin to accrue immediately upon completion and implementation of the project (estimate by January 1, 2022) as the reduction in TSS discharged to the ocean will also be realized at the same time. This will be quantified by the effluent monitoring at the PLWTP that is being carried out in compliance with the discharge permit. Any potential changes in the ocean are likely to occur over a longer timescale and will be detected and reported in conjunction with the comprehensive ocean monitoring program.

Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the realization timeframe is described and quantified.

Enter location(s)

REV 6: Duration of ecosystem improvements

How long (number of years) after realization (as calculated under REV 5 above) is the ecosystem improvement expected to address this priority? Maximum is 100 years. Explain how this value was determined and whether the magnitude of the ecosystem improvement is anticipated to change over time.

The Pure Water Phase 1 project is anticipated to have an infrastructure design life of 50 years or greater and deliver the full realization of the improvement throughout that duration. Over 50 years this will keep a total of 85,000 metric tons (187.5 million pounds) of TSS and associated pollutants out of the ocean.¹

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¹Task Order 24 (Brown and Caldwell Inc. Draft Metropolitan Biosolids Center Biosolids Technology Evaluation. Provided to the City of San Diego under Task Order 24, P. 7-13 to 7-14, Figure 7-1, Tables 7-5 to 7-10 and P. 258/450 and 315/450 of the PDF, February 24, 2017) See attachment a-1 of submitted documents

Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the duration of the ecosystem improvement is described and quantified.

Enter location(s)

REV 7: Consistency with species recovery plans and strategies, initiatives, and conservation plans

Does the ecosystem improvement meet any goals or objectives established in existing species recovery plans, initiatives, or conservation plans including but not limited to the NOAA Fisheries Recovery Plan for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead; State Wildlife Action Plan; Central Valley Joint Venture Implementation Plan, San Joaquin County Multi-Species Habitat Conservation Plan and Open Space Plan, Draft Solano Multi-Species Habitat Conservation Plan, East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan, Draft Recovery Plan for the Giant Garter Snake, and California Water Action Plan? If so which goals, objectives, or actions will be met? Why?

This project falls under the Multiple Species Conservation Plan (MSHCP). The MSHCP is enforced by the City of San Diego Planning department. Every capital improvement project must comply with this plan. The MSHCP is located at: <https://www.sandiego.gov/planning/programs/mscp/mgmtplans>.

Additional locations in the application, supporting documentation or attachments (page number, table number, other) where the consistency with goals, objectives, or actions from recovery plans, initiative, or conservation plans are discussed.

Enter location(s)

REV 8: Location of ecosystem improvements and connectivity to areas already being protected or managed for conservation values

Provide a map that shows the extent of the ecosystem improvement that will address this priority (e.g. river miles that meet the temperature benefits). Provide additional instructions or clarification to reviewers who will be viewing this map (i.e. describe the color and/or label that identifies the spatial extent of the ecosystem improvement). If available, also submit supporting electronic files such as a .kmz file or ArcGIS layer associated with the maps provided.

The Point Loma Outfall (PLOO) terminates in the Pacific Ocean 7.2 kilometers west of the PLWTP and at a depth of approximately 100 meters. The comprehensive ocean monitoring program covers about 340 square miles of the ocean adjacent to the San Diego coastline. Ecosystem improvement would occur within this area, specifically close to the vicinity of the PLOO discharge point. However, the ocean monitoring is robust enough in both time scale and space that it can examine effects anywhere within its operational boundaries.

The attached map illustrates the location of the PLWTP and the ocean outfall where the discharge occurs and the monitoring region (see page 8 Map 1 Point Loma Outfall Location Map)

Explain why this location was selected in the context of local environmental conditions and the target constituent(s). Why was this location selected over other potential locations?

The PLWTP is an existing facility with newly found benefits (suspended solids reduction) resulting from the Pure Water Phase 1 Project. The PLWTP is a terminal ocean discharging facility in the wastewater system. The Pure Water project facilities, potable reuse water reclamation treatment plants, are to be located upstream in the PLWTP wastewater system that is tributary to the existing PLWTP. Wastewater that without the project would go to the PLWTP is to be diverted and highly treated to potable standards for discharge to the drinking water system. TSS and other pollutants removed during the upstream treatment process are eliminated from the system tributary to the PLWTP, thereby permanently eliminating them from the discharge to the ocean at the PLWTP.

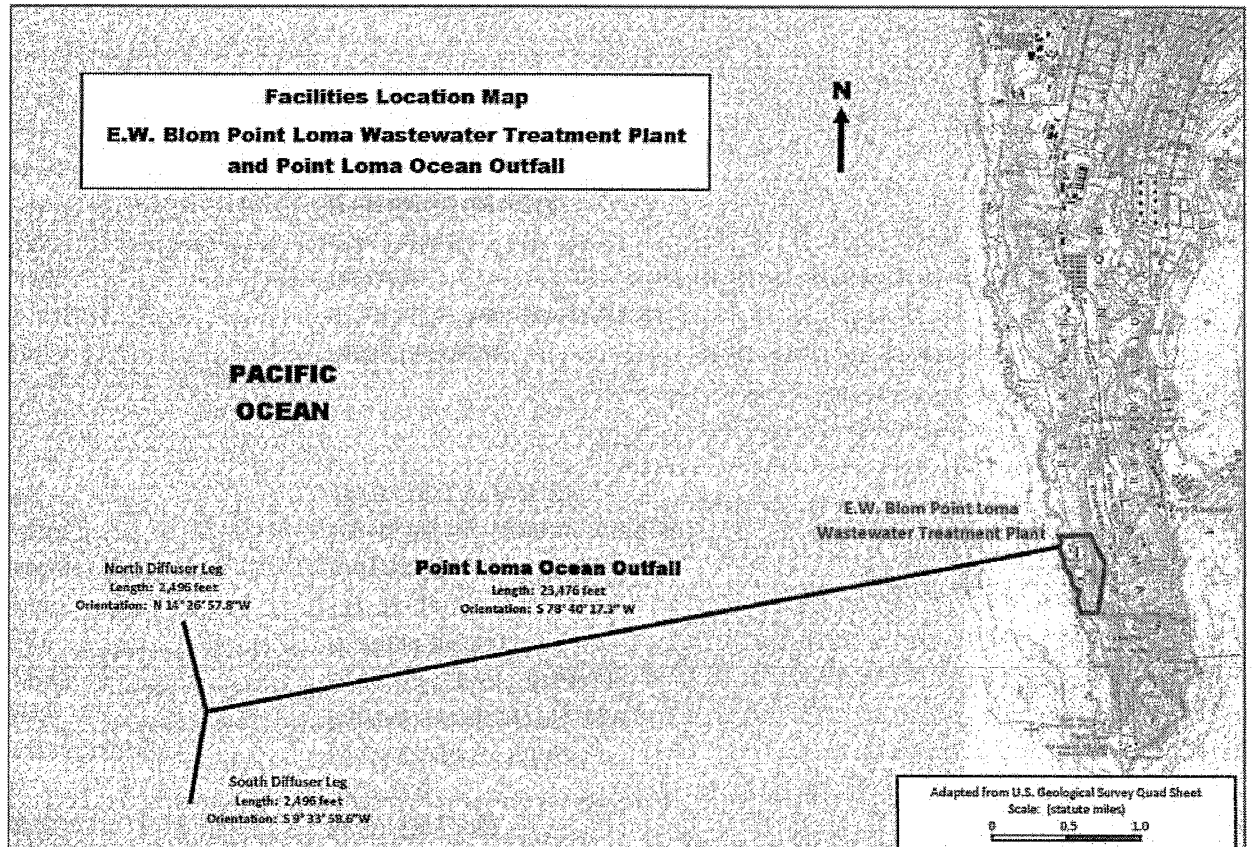
Is the ecosystem water quality improvement location adjacent to, or near, other areas already being protected or managed for conservation values? Explain the proximity of the ecosystem water quality improvement to other areas already being protected or managed for conservation values and any hydrologic connectivity that may occur between these locations.

The Sunset Cliffs Natural Park, the Point Loma Ecological Reserve and the San Diego Bay National Wildlife Refuge are all near the City's Point Loma Wastewater Treatment Plant.

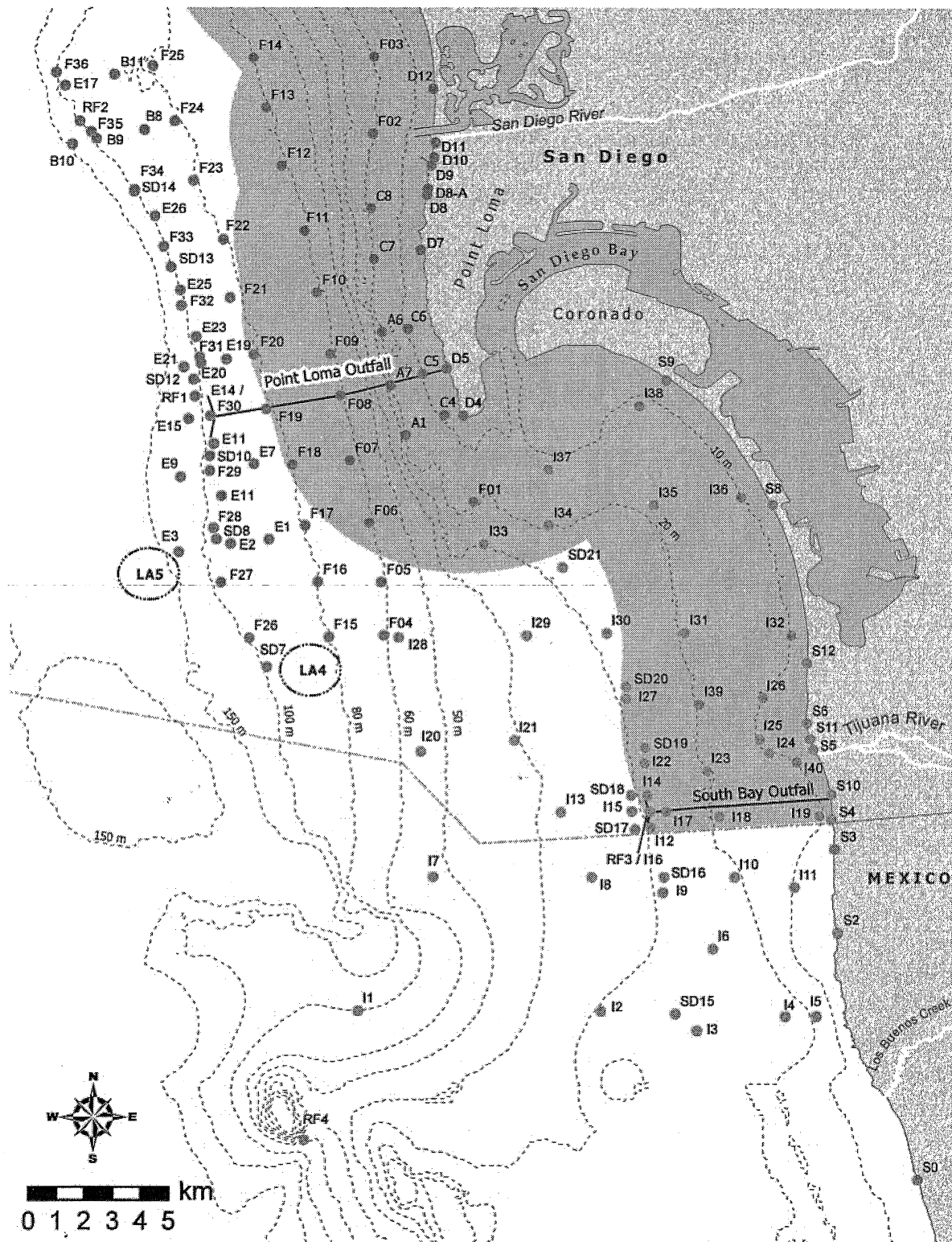
Ecosystem Priorities Application Worksheet (August 2016)

<p>Additional locations in the application (document name, page number, figure name or number, other) that describe the extent of the ecosystem water quality improvements, the proximity of claimed improvements to other areas already being protected or managed for conservation value, and the degree to which hydrologic connections (if any) occur between claimed improvements and areas already being protected or managed for conservation value.</p>
<p>Enter location(s)</p>
<p>REV 9: Efficient use of water to achieve multiple ecosystem benefits</p>
<p>If applicable, how will water provided to address this priority be managed? Explain design efficiencies and operational strategies intended to maximize the efficiency of water allocated to ecosystem improvements that address this priority.</p>
<p>Not directly applicable to this benefit and priority; however, the Project will provide a system that will continuously provide an annual average of 30 mgd of reliable drinking water supply that is locally controlled and drought-proof. These benefits are significant to the State of California and will benefit the ecosystem of the Delta.</p>
<p>Additional locations in the application, supporting documentation or attachments (document name, page number, figure name or number, other) that describe the design efficiencies and operational strategies used to maximize water efficiency under this priority.</p>
<p>Enter location(s)</p>
<p>REV 10: Resilience of ecosystem improvements to the effects of changing environmental conditions, including hydrologic variability and climate change.</p>
<p>Which environmental uncertainties associated with this priority were considered in the project siting, design, and operation? How were these uncertainties incorporated into project siting, design, or operation? Examples of environmental uncertainties include, but are not limited to: sea level rise, temperature changes, changes in precipitation, landslides, erosion, earthquakes, wildfires, drought events, and flooding events.</p>
<p>Unlike many traditional storage projects which rely on predictable precipitation and runoff the benefits found in Phase 1 of Pure Water will be consistent for the life of the Project. These benefits will be resilient to climate change and drought. The Project is designed to endure climate change factors, earthquakes, fires and other natural disasters. Planned expansion of the program will further enhance this resiliency within the Region. As a result, diversions from Pure Water will be relatively consistent throughout the year (averaging 30 mgd) and the reduction in solids loading from the PLWTP is expected to be consistent.</p>
<p>Additional locations in the application, supporting documentation or attachments (document name, page number, figure name or number, other) that describe and quantify the environmental uncertainties considered in the project siting, design, and operation.</p>
<p>Enter location(s)</p>

Map 1: Pt. Loma Ocean Outfall Location



Map 2: Ocean Monitoring Stations (Green station specific to the PLOO)



Priority 16: Enhance habitat for native species that have commercial, recreational, scientific, or educational uses**REV 2: Magnitude of ecosystem improvements**

What is the expected magnitude of the ecosystem improvement that will address this priority? Magnitude should be expressed as: a) the change from current conditions without the project to current conditions with the project, and b) the change from 2030 conditions without the project to 2030 conditions with the project. How did you estimate this value?

The project will reduce the discharge of Total Suspended Solids (TSS) and other associated pollutants in the effluent from the Pt. Loma Wastewater Treatment Plant (PLWTP) that discharges treated effluent into the Pacific Ocean through the Point Loma Ocean Outfall (PLOO). In 2030 the PLWTP without the project is projected discharge 10,900 metric tons of TSS per year. With the project the discharge is projected to decline to only 9,000 metric tons of TSS for the year. This is a reduction of 1,900 metric tons of TSS to the ocean for the year. That is 17% less TSS and associated pollutants than would have gone to the ocean without the project. This value was estimated in accordance with standard engineering practices and presented in the mass balance model provided to the City of San Diego in Task Order 24. (Brown and Caldwell Inc. Draft Metropolitan Biosolids Center Biosolids Technology Evaluation. Provided to the City of San Diego under Task Order 24, P. 7-13 to 7-14, Figure 7-1, Tables 7-5 to 7-10 and P. 258/450 and 315/450 of the PDF, February 24, 2017) see attachment a-1 of submitted documents

Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the magnitude of the ecosystem improvement is described and quantified.

See attachment a-1 of submitted documents: Task Order 24 (Brown and Caldwell Inc. Draft Metropolitan Biosolids Center Biosolids Technology Evaluation. Provided to the City of San Diego under Task Order 24, P. 7-13 to 7-14, Figure 7-1, Tables 7-5 to 7-10 and P. 258/450 and 315/450 of the PDF, February 24, 2017)

REV 3: Spatial and temporal scale of ecosystem improvements.

What is the geographical extent (e.g. river miles, acres) of the ecosystem improvement that will address this priority?

This ecosystem improvement is expected to benefit the Pacific Ocean and shorelines in the vicinity of the PLWTP. The PLOO terminates in the Pacific Ocean 4.5 miles west of the PLWTP and at a depth of approximately 310 feet. ¹ Upon initial dilution effluent TSS are mixed with the ambient marine particles and entrained in the receiving waters where they are subject to the effects of ocean stratification and currents. ² The geographical extent of the improvement will depend on these variables but previous ocean monitoring indicates that the changes would be most apparent within the immediate vicinity of the discharge. ^{1,2} Past ocean monitoring has detected the only sustained effects that can be related to TSS have been mostly restricted to a few sites located within about 400-1000 feet of the outfall discharge zone. ² These effects have included measurable increases in sediment sulfide and BOD concentrations. ²

However, the ocean monitoring program, that will be the vehicle by which improvements are quantified, is very large and comprehensive and covers a spatial area of 340 square miles insuring that any improvements, even beyond the immediate vicinity of the discharge are measured. ¹ A map of the discharge area and monitoring is attached.

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<https://www.sandiego.gov/sites/default/files/legacy/mwwd/pdf/facilities/2015/301vol5.pdf>

Additional locations in the application, supporting documentation or attachments (document name, page number, figure name or number, other) where the geographical extent of the ecosystem improvement is documented or mapped.

Enter location(s)

Attached are the following maps.

See page 6 Map 1: Point Loma Outfall Location Map

See page 7 Map 2: Ocean Monitoring Stations

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<p>When during the year will the project enhance habitat for native species that have commercial, recreational, scientific or educational uses? How is habitat for native species likely to vary with hydrologic conditions (i.e. among water year types) a) under current conditions with and without the project, and b) in 2030 with and without the project?</p>
<p>The reduction in solids load is expected to be consistent because the diversions for Pure Water will be relatively consistent throughout the year averaging 30 million gallons per day of potable reuse water production. So the commensurate reduction in TSS discharged at Pt. Loma will also be consistent and realized in the daily discharge from the PLWTP.</p>
<p>Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the magnitude of the ecosystem improvement is described and quantified.</p>
<p>Enter location(s)</p>
<p>REV 4: Inclusion of an adaptive management and monitoring program that includes measurable objectives, performance measures, thresholds, and triggers to achieve ecosystem benefits.</p>
<p>Provide additional information on how this ecosystem improvement will be incorporated into the adaptive management and monitoring program. If available, provide examples of objectives, performance measures, thresholds, or triggers that could be used to manage benefits associated with this priority.</p>
<p>Prior to start-up of the facilities, Operations and Maintenance (O&M) Manuals will be completed. The O&M Manuals will include protocols for operations and include troubleshooting procedures. The attached Enterprise Level Control Strategy report will serve as a cornerstone of how the facilities are operated. Since the facilities will produce purified potable water supplies via indirect potable reuse, the State's Division of Drinking Water will require significant redundancy measures and of monitoring of the facilities to protect public health. The North City Pure Water Project Title 22 Report describes the operational parameters, monitoring, reliability and redundancy that will be implemented at the Pure Water facility.¹ These controls provide the failure prevention and failure response provisions that will allow the facility to reliably produce 30 MGD of potable reuse water on a daily basis, while insuring that all regulatory requirements are met to protect public health.¹</p> <p>Additionally, it is important to note that wastewater sludge that is removed at the Pure Water Facility will be transported in a dedicated pipeline for processing at a dedicated biosolids facility.¹ Sludge will not returned to the sewer system. This seamless operation of the Pure Water facility in conjunction with the biosolids processing plant insures that TSS and related pollutants are reliability and continually removed from the wastewater system tributary to the PLWTP. Resulting in off-loading the influent to the PLWTP thereby reducing the TSS and associated pollutants in the discharge.</p> <p>The relationship between wastewater treated at the PLWTP and discharged to the ocean via the PLOO with the coastal marine environment is thoroughly regulated by an extremely rigorous Monitoring and Reporting Program (MRP) that includes assessments of both effluent quality and receiving waters (ocean) conditions.^{2,3} This MRP is codified in the NPDES discharge permit for the PLWTP.⁴ The program has been specifically designed to interface seamlessly with another program for the South Bay Ocean Outfall, and as such to be able to assess any impacts of the wastewater discharges as well as other anthropogenic or natural influences on San Diego marine environment.³ The combined Ocean Monitoring Program covers about 340 square miles off the San Diego coast, from Northern San Diego County to Northern Baja California and from the shoreline to 10 miles off shore and to depths of about 1600 feet (see attachment 1-3: Map 2 Ocean Monitoring Stations)³</p> <p>The TSS in the discharge is measured daily in the monitoring of PLWTP influent and effluent.² The comprehensive design of the ocean monitoring program makes it fully capable of detecting and evaluating any effects of TSS or other components in the discharge. Seafloor sediments and their associated biological communities are sampled and analyzed at 89 locations each year off San Diego, of which 22 core stations are designed specifically to assess any impacts of the PLWTP discharge.^{2,3} The remaining stations are designed to either monitor the SBOO region or to provide further background data on reference conditions for the entire San Diego region. Specific parameters are analyzed in the ocean sediments that can be affected by the amount of TSS in the discharge including grain size, total organic carbon, biochemical oxygen demand, sulfides, metals and toxic organics.^{2,3} The small marine invertebrates (e.g. worms, crabs, snails, brittle stars) living within or on the surface of the ocean floor are also identified and enumerated in order to assess the health and status of their communities.^{2,3}</p> <p>Due to at least in part to the present low levels of TSS in the PLWTP discharge very little evidence exists of any possible TSS effect on the marine environment.⁵ Most of the measured parameters have continued to exist at levels within the range of natural variability for the San Diego region and other Southern California Bight reference areas.⁵ The only sustained effects that may be related to TSS or other wastewater constituents have been restricted to mostly a few sites located within about 400-1000 feet of the outfall discharge zone (i.e. near the zone of initial dilution, ZID).⁵ These near-ZID effects have included measurable increases in sediment sulfide and BOD concentrations.⁵ However, none of these small increases have affected the sediment quality to the point where the resident marine biota has been significantly impaired or degraded.⁵ In future years San</p>

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Diego's Ocean Monitoring Program will continue to be able to track and quantify these and any other effects that may result from changes in the amount of TSS discharged.

1. Draft North City Pure Water Project Title 22 Engineering Report. January 2018; Section 13, Reliability; pages 13-1 thru 13-39; Section 15, Monitoring and Reporting Program: pages 15-1 thru 15-27, Section 16, North City Operation Plan: pages 16-1 thru 16-15 and Section 6, Project Facilities Description: pages 6-31 thru 6-32. See attachment a-2 of submitted documents
2. US Environmental Protection Agency, and California Regional Water Quality Control Board. 2017. Order R9-2017-0007, NPDES No. CA0107409 Waste discharge Requirements and NPDES permit for City of San Diego E. W. Blom Point Loma Wastewater Treatment Plant Discharge to the Pacific Ocean through the Point Loma Ocean Outfall, August 2017, Attachment E; P.E-1 thru E-39. Available at:
https://www.waterboards.ca.gov/sandiego/board_decisions/adopted_orders/2017/R9-2017-0007.pdf
3. City of San Diego - Public Utilities department - Environmental Monitoring and Technical Services Division. 2017. 2016 Annual Receiving Waters Report for the Point Loma Ocean Outfall and the South Bay Ocean Outfall, June 2017. Available at:
<https://www.sandiego.gov/sites/default/files/qarpt16.pdf>
4. US Environmental Protection Agency, and California Regional Water Quality Control Board. 2017. Order R9-2017-0007, NPDES No. CA0107409 Waste discharge Requirements and NPDES permit for City of San Diego E. W. Blom Point Loma Wastewater Treatment Plant Discharge to the Pacific Ocean through the Point Loma Ocean Outfall, August 2017. Available at:
https://www.waterboards.ca.gov/sandiego/board_decisions/adopted_orders/2017/R9-2017-0007.pdf
5. City of San Diego - Public Utilities Department. 2015. Application for Renewal of NPDES CA0107409 and 301(h) Modified Secondary Treatment Requirements, Volume V, January 2015, Appendix C; P. C1-C4. Available at:
<https://www.sandiego.gov/sites/default/files/legacy/mwwd/pdf/facilities/2015/301vol5.pdf>

REV 5: Immediacy of ecosystem improvement actions and realization of benefits

Immediacy of ecosystem improvement: Number of months from grant encumbrance until the proposed ecosystem improvement is completed (i.e. the expected timeframe until the improvement is implemented or construction is completed).

The Pure Water Phase 1 project is expected to be online in 2022. The beginning of the ecosystem improvement will be realized immediately upon start-up of the project as a reduction in TSS discharge will be immediately commensurate with the project going on line. Positive effects on the ocean environment may be recognized over a much longer time frame and may be subtle in nature but can become evident through the rigorous ocean monitoring and analysis of data carried out by the City of San Diego in compliance with the PLWTP National Pollutant Discharge Elimination System Permit (NPDES) discharge permit and in consultation with the USEPA, California State Regional Water Quality Control region 9, Southern California Coastal Water Research Project and Scripps Institution of Oceanography. Per California Water Commission schedule for the Water Storage Investment Program we anticipate grant encumbrance to be June 2018.

Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the immediacy timeframe is described and quantified.

Enter location(s)

Realization of ecosystem improvement: Number of months from the time the ecosystem improvement is completed (i.e. project is implemented or construction is complete), until the benefit associated with this priority can be observed (i.e. when measurable improvements can be observed and quantified)

It is expected that the water quality benefits to the Delta will be realized soon after the demand reduction is implemented. The benefits will be realized sooner during dry period or drought. Benefits to the effluent discharge at the PLWTP will also begin to accrue immediately upon completion and implementation of the project (estimated by January 1, 2022) as the reduction in TSS discharged to the ocean will also be realized at the same time. This will be quantified by the effluent monitoring at the PLWTP that is being carried out in compliance with the discharge permit. Any potential changes in the ocean are likely to occur over a longer timescale and will be detected and reported in conjunction with the comprehensive ocean monitoring program.

Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the realization timeframe is described and quantified.

Enter location(s)

REV 6: Duration of ecosystem improvements

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How long (number of years) after realization (as calculated under REV 5 above) is the ecosystem improvement expected to address this priority? Maximum is 100 years. Explain how this value was determined and whether the magnitude of the ecosystem improvement is anticipated to change over time.

The Pure Water Phase 1 project is anticipated to have an infrastructure design life of 50 years or greater and deliver the full realization of the improvement throughout that duration. Over 50 years this will keep a total of 85,000 metric tons (187.5 million pounds) of TSS and associated pollutants out of the ocean.¹

¹Task Order 24.(Brown and Caldwell Inc. Draft Metropolitan Biosolids Center Biosolids Technology Evaluation. Provided to the City of San Diego under Task Order 24, P. 7-13 to 7-14, Figure 7-1, Tables 7-5 to 7-10 and P. 258/450 and 315/450 of the PDF, February 24, 2017) see attachment a-1 of submitted documents

Additional locations in the application, supporting documentation or attachments (document name, page number, table number, other) where the duration of the ecosystem improvement is described and quantified.

Enter location(s)

REV 7: Consistency with species recovery plans and strategies, initiatives, and conservation plans

Does the ecosystem improvement meet any goals or objectives established in existing species recovery plans, initiatives, or conservation plans including but not limited to the NOAA Fisheries Recovery Plan for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead; State Wildlife Action Plan; Central Valley Joint Venture Implementation Plan, San Joaquin County Multi-Species Habitat Conservation Plan and Open Space Plan, Draft Solano Multi-Species Habitat Conservation Plan, East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan, Draft Recovery Plan for the Giant Garter Snake, and California Water Action Plan? If so which goals, objectives, or actions will be met? Why?

This project falls under the Multiple Species Conservation Plan (MSHCP). The MSHCP is enforced by the City of San Diego Planning department. Every capital improvement project must comply with this plan. The MSHCP is located at: <https://www.sandiego.gov/planning/programs/mscp/mgmtplans>.

Additional locations in the application, supporting documentation or attachments (page number, table number, other) where the consistency with goals, objectives, or actions from recovery plans, initiative, or conservation plans are discussed.

No connection to these plans is known at this time.

REV 8: Location of ecosystem improvements and connectivity to areas already being protected or managed for conservation values

Provide a map that shows the extent of the ecosystem improvement that will address this priority (e.g. river miles that meet the temperature benefits). Provide additional instructions or clarification to reviewers who will be viewing this map (i.e. describe the color and/or label that identifies the spatial extent of the ecosystem improvement). If available, also submit supporting electronic files such as a .kmz file or ArcGIS layer associated with the maps provided.

The Point Loma Outfall (PLOO) terminates in the Pacific Ocean 7.2 kilometers west of the PLWTP and at a depth of approximately 100 meters. The comprehensive ocean monitoring program covers about 340 square miles of the ocean adjacent to the San Diego coastline. Ecosystem improvement would occur within this area, specifically close to the vicinity of the PLOO discharge point. However, the ocean monitoring is robust enough in both time scale and space that it can examine effects anywhere within its operational boundaries.

The attached map illustrates the location of the PLWTP and the ocean outfall where the discharge occurs and the monitoring region (see page 6 Map 1 Point Loma Outfall Location Map).

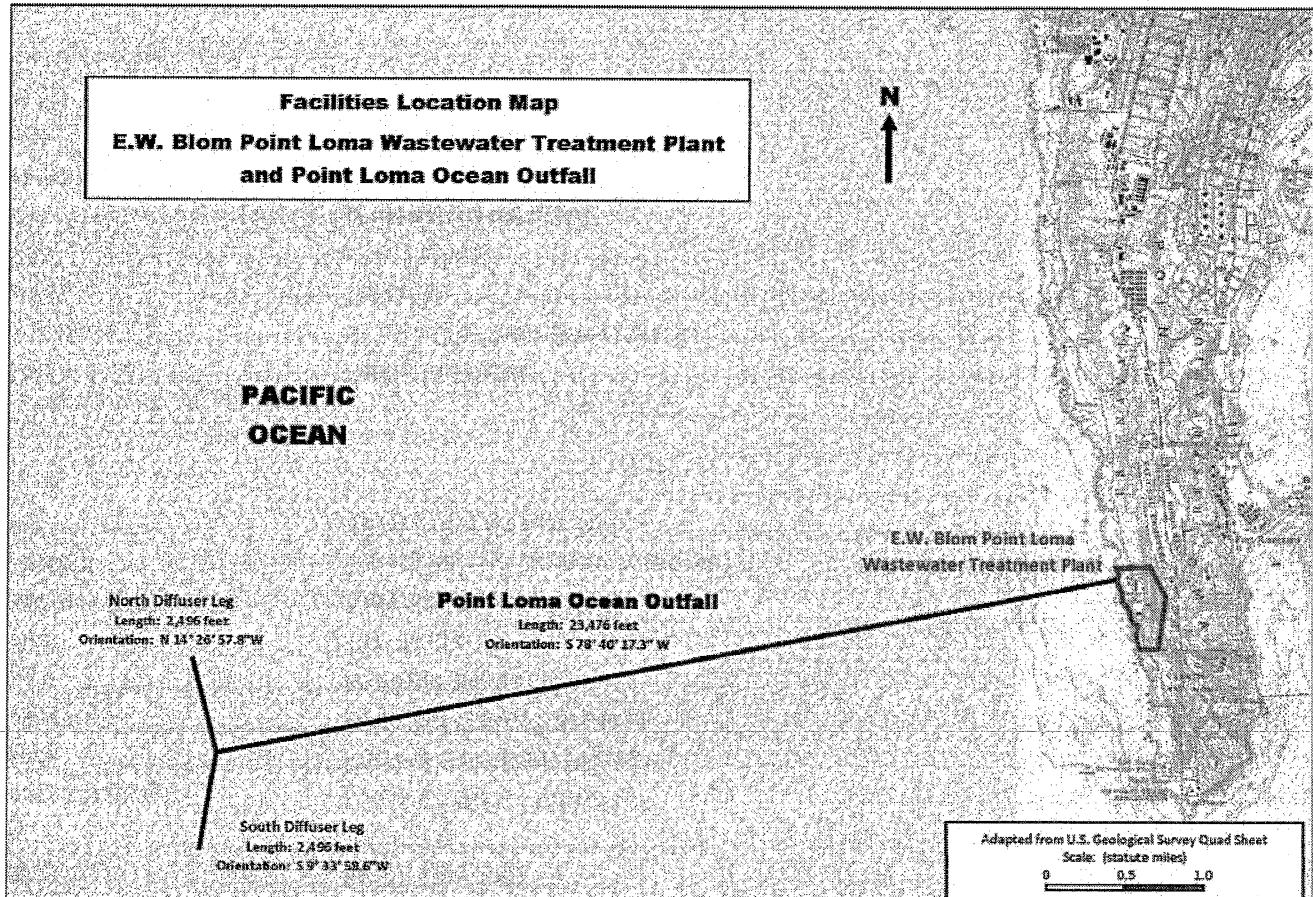
Explain why this location was selected. How is the location of enhanced habitat beneficial in the context of local environmental conditions?

The City's Point Loma Wastewater Treatment Plant (PLWTP) is an existing facility with newly found benefits (suspended solids reduction) resulting from the Pure Water Phase 1 Project. The PLWTP is a terminal ocean discharging facility in the wastewater system. The Pure Water project facilities, potable reuse water reclamation treatment plants, are to be located upstream in the PLWTP wastewater system that is tributary to the existing PLWTP. Wastewater that without the project would go to the PLWTP is to be diverted and highly treated to potable standards for discharge to the drinking water system. TSS and other pollutants removed during the upstream treatment process are eliminated from the system tributary to the PLWTP, thereby permanently eliminating them from the discharge to the ocean at the PLWTP.

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<p>Is the ecosystem improvement location adjacent to, or near, other areas already being protected or managed for conservation values? Explain the proximity of the ecosystem improvement to other areas already being protected or managed for conservation values and any hydrologic connectivity that may occur between these locations.</p>
<p>The Sunset Cliffs Natural Park, the Point Loma Ecological Reserve and the San Diego Bay National Wildlife Refuge are all near the City's Point Loma Wastewater Treatment Plant.</p>
<p>Additional locations in the application, supporting documentation or attachments (document name, page number, figure name or number, other) that describe and quantify the spatial extent of the ecosystem improvement, the proximity of the ecosystem improvement to other areas already being protected or managed for conservation value, and the degree to which hydrologic connections (if any) occur between the ecosystem improvement and areas already being protected or managed for conservation value.</p>
<p>Enter location(s)</p>
<p>REV 9: Efficient use of water to achieve multiple ecosystem benefits</p>
<p>If applicable, how will water provided to address this priority be managed? Explain design efficiencies and operational strategies intended to maximize the efficiency of water allocated to ecosystem improvements that address this priority.</p>
<p>Not directly applicable to this benefit and priority; however, the Project will provide a system that will continuously provide an annual average of 30 mgd of reliable drinking water supply that is locally controlled and drought-proof. These benefits are significant to the State of California and will benefit the ecosystem of the Delta.</p>
<p>Additional locations in the application, supporting documentation or attachments (document name, page number, figure name or number, other) that describe the design efficiencies and operational strategies used to maximize water efficiency under this priority.</p>
<p>Enter location(s)</p>
<p>REV 10: Resilience of ecosystem improvements to the effects of changing environmental conditions, including hydrologic variability and climate change.</p>
<p>Which environmental uncertainties associated with this priority were considered in the project siting, design, and operation? How were these uncertainties incorporated into project siting, design, or operation? Examples of environmental uncertainties include, but are not limited to: sea level rise, temperature changes, changes in precipitation, landslides, erosion, earthquakes, wildfires, drought events, and flooding events.</p>
<p>Unlike many traditional storage projects which rely on predictable precipitation and runoff the benefits found in Phase 1 of Pure Water will be consistent for the life of the Project. These benefits will be resilient to climate change and drought. The Project is designed to endure climate change factors, earthquakes, fires and other natural disasters. Planned expansion of the program will further enhance this resiliency within the Region. As a result, diversions from Pure Water will be relatively consistent throughout the year (averaging 30 mgd) and the reduction in solids loading from the PLWTP is expected to be consistent.</p>
<p>Additional locations in the application, supporting documentation or attachments (document name, page number, figure name or number, other) that describe and quantify the environmental uncertainties considered in the project siting, design, and operation.</p>
<p>Enter location(s)</p>

Map 1: Pt. Loma Ocean Outfall Location



Map 2: Ocean Monitoring Stations (Green station specific to the PLOO)

